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Sustainable Aquaculture for a Secure Future

Title: Effects of Adding Shrimp (*Penaeus monodon*) into Intensive Culture Ponds of Nile Tilapia (*Oreochromis niloticus*) at Different Densities

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Abstract: This experiment was conducted in nine 200m² earthen ponds at the Asian Institute of Technology, Thailand for 133 days from 21 May to 2 October 2003, to investigate effects of adding shrimp (*Penaeus monodon*) into intensive Nile tilapia (*Oreochromis niloticus*) ponds on the growth performance, water quality and nutrient utilization efficiency in different stocking combinations of tilapia shrimp polyculture. There were three treatments in triplicate each: tilapia at 11m² and shrimp at 151m² (low tilapia density), tilapia at 21m² and shrimp at 151m² (medium tilapia density), tilapia at 41m² and shrimp at 151m² (high tilapia density).

Mean daily weight gains and final mean weight of tilapia in the low tilapia density treatment was significantly greater than those in the medium and high tilapia density treatments, between which there was no significant difference. However, total weight gain, and net and gross yields of tilapia were highest in the high tilapia density treatment, intermediate in the medium tilapia density treatment, and lowest in the low tilapia density treatment. Final mean weight of shrimp was not significantly different among all treatments, however, survival and net and gross "yields in the high tilapia" density treatment were significantly poorer than those in the medium and low tilapia density treatments, between which there

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were no significant differences.

Nutrients incorporated by Nile tilapia biomass accounted for 48.01%, 52.89%, and 48.99% of TN, and 60.55%, 68.47% and 62.25% of TP inputted from fertilizer and pelleted feeds in the low, medium and high tilapia density treatments, respectively, while shrimp recovered only 1.10% and 0.33% of TN, and 0.55% and 0.27% of TP in the low and medium tilapia density treatments. However, nutrients were lost through deaq shrimps in the high tilapia density treatment. Overall mean DO concentrations at both surface and bottom were highest in the low tilapia density treatment, intermediate in the medium and lowest in the high tilapia density treatment. Overall mean concentrations of TAN tended to be higher at higher tilapia density.

The present experiment indicated that adding shrimp into Nile tilapia ponds is technically feasible, however, more research is needed to optimize the tilapia-shrimp polyculture system.

This abstract was excerpted from the original paper, which was in the Proceedings for the 6th International Symposium on Tilapia in Aquaculture, 12-16 September 2004, vol 2 pp.794-805.